Brine contamination to the Prairie Pothole Region from Energy Development in the Williston basin

Joanna Thamke, USGS & Todd Preston, USGS contractor

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The central portion of the Prairie Pothole Region, a wetland-rich area that is critical to North America's migratory waterfowl, overlies oil-rich formations of the Williston basin. Substantial volumes of brine have been co-produced with oil contaminating the potholes and connected groundwater. Using a contamination index developed by Montana Bureau of Mines and Geology and enhanced by USGS, wetlands can be rapidly assessed for brine contamination by using a ratio of field chloride to specific conductance. While there might be variations in other parts of the Williston basin, a water contamination index greater than 0.035 in Sheridan County, Montana is a predictor of brine contamination. Factors such as the age and number of nearby oil wells, proximity of oil wells to wetlands and streams, and presence of coarse outwash deposits that hydraulically move contaminants at greater rates can increase a wetland's vulnerability to brine contamination. Brine contamination can persist in the glacial deposits for at least several decades. Additional details about this work are available on the project web page: http://steppe.cr.usgs.gov/.